

ABSTRACT

A system and method for reducing harmonics in a circuit is disclosed. The system comprises a main rectifier, $\left(\frac{n}{3} - 1\right)$ auxiliary rectifiers connected to the main rectifier, and an autotransformer connected to both the main rectifier and the auxiliary rectifiers which provides $2n$ -pulse rectification where n equals the number of phases of the system. The autotransformer generates $\left(\frac{n}{3} - 1\right)$ auxiliary voltage sets, each auxiliary voltage set having an auxiliary voltage amplitude, k , and an auxiliary voltage phase, α , wherein $k = \sqrt{4 + 2\sqrt{3}\cos(\theta - \frac{7\pi}{6})}$ and wherein $\alpha = \sin^{-1}\left(\frac{\sqrt{3}\sin\theta - 0.5}{k}\right)$ assuming a main voltage amplitude of one and a main voltage phase of ninety degrees, wherein $\theta = \frac{180^\circ}{n}$ and its integral multiples for all possible real values of k . The main rectifier has a main rectifier power rating, P_{mdb} wherein $P_{mdb} \geq \left(\frac{n+3}{2n}\right)$ times the load power, and the auxiliary rectifiers each have an auxiliary power rating, P_{auxdb} , wherein $P_{auxdb} \leq \left(\frac{3}{2n}\right)$ times the load power.